**Capstone Project Proposal for Springboard’s Intermediate Python for Data Science**

PROBLEM

Ski Resort operations are optimized by accurate snowfall forecasts. However, complex terrain in mountainous areas often make predicting snowfall difficult with prognostic weather models. With accurate snow forecasts, ski resorts can optimize their snowfall making, grooming, and snow removal operations if given advance notice. An accurate snowfall forecast, even for a small segment of the mountain may assist the ski resorts operation.

HYPOTHESIS

The Copper Mountain Ski Resort in Colorado is unique in that it has a , as well as an Automated Weather Observing System (AWOS) funded through the Colorado Department of Transportation (CDOT) and SNOTEL station funded through the National Resource Conservation Service. The AWOS stations reports hourly variables and is located at the near the summit of Copper mountain. The SNOTEL site records hourly snow depth, snow water equivalent, soil moisture, and temperature. It is located in the midst of some of the ski resort’s popular ski runs. The distance between the stations is approximately 2.2 km (0.5 mi). Both sites have concurrent data stretching over 10 years. Using statistical techniques, it is anticipated that patterns of past meteorological conditions exist and could be used to accurately forecast daily snowfall amounts at Copper Mountain.

PROCEDURE

1. Hourly meteorological csv or tab delimited data will be downloaded for both the AWOS and SNOTEL stations for years 2006-2017
2. Available hourly data will be parsed using Python. Hourly temperature and snow depth data from the SNOTEL site, as well hourly temperature, dewpoint, wind speed, wind direction, and sky cover from the AWOS site will be merged into a single columnar list/dictionary.
3. Daily snow depth data will be calculated from this dataset
4. Years 2008-2017 will be used to train the model, while years 2006-2007 will be used to test the model.
5. Statistics regarding how well the model predicted daily snowfall during years 2006-2007 will calculated.

DATASETS

Hourly meteorological data (temp, dewpoint wind speed, wind direction, and sky cover) for the Copper Mountain, AWOS station will be obtained from the National Climatic Data Center (NCDC) Integrated Surface Daily (ISD) website: <ftp://ftp.ncdc.noaa.gov/pub/data/noaa/isd-lite/>

Additional information on ISD datasets can be found here:  <https://www.ncdc.noaa.gov/isdDaily> The “Lite” version will be obtained as this dataset contains easily readable column data of the most commonly used meteorological variables

Snowfall data from the NRCS Copper Mountain, CO station will be downloaded in csv format from the NRCS website: ( <https://wcc.sc.egov.usda.gov/nwcc/site?sitenum=415>)

DELIVERABLES

Deliverables will include documented code on a Git Repository or Juypter notebook, along with a powerpoint slide deck which describes the project and results of the study